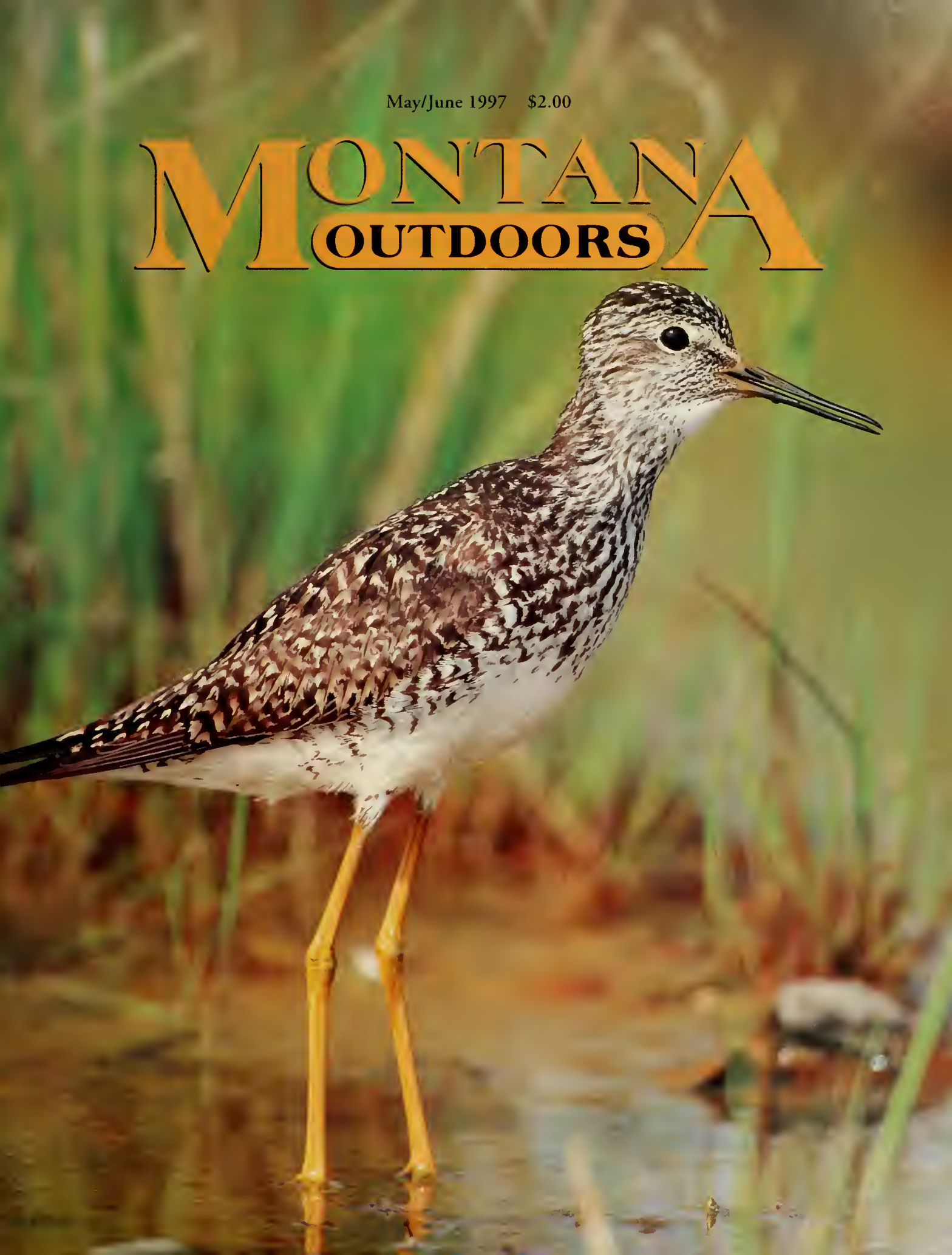
May/June 1997 $2.00

MONTANA OUTDOORS



Our Point of View

Whirling disease has been discovered in more and more waters, leaving us with more and more questions. What will happen to our wild trout fisheries? We do not know. How did it get here? Don't know for sure. Is there a cure? Not as there is for human diseases. Eventually some fish will likely develop an immunity or change the time and place they spawn and rear to avoid the parasite. So what can do? Here's an idea.

Although brown trout have remained abundant and healthy in the Madison River, rainbow trout have declined dramatically. The rainbow's future remains uncertain. There is another trout in the system whose fate is also uncertain, for different reasons. The native westslope cutthroat trout may be petitioned for listing as an endangered species. They have declined in number over the last 100 years for a variety of reasons, including competition with non-native fish like rainbow trout.

AL TROTH

Cutthroat spawn and rear in small headwater streams that are not infected with whirling disease. Since the parasite does most of its damage in the first year of a fish's life, cutthroat in these small streams have an advantage if we can keep these streams free of whirling disease. As the cutthroats grow to a large size, they move downstream and eventually into the Madison River. There they will find room vacated by the rainbow trout. This may present a very unique opportunity to expand the range of the cutthroat trout and reduce the need for listing it as endangered, and at the same time provide a more diverse recreational fishery in the nation's most famous trout stream.

The department, in cooperation with many others, has developed a proposal to protect and restore cutthroat to 10 Madison tributaries by 2001 and has taken the proposal to the public.

It is an idea worth trying.

Pat

Patrick J. Graham, Director
Montana Fish, Wildlife & Parks

E. NEALE STREEKS

Mayfly hatches provide some of flyfishing's most exciting moments (page 14).

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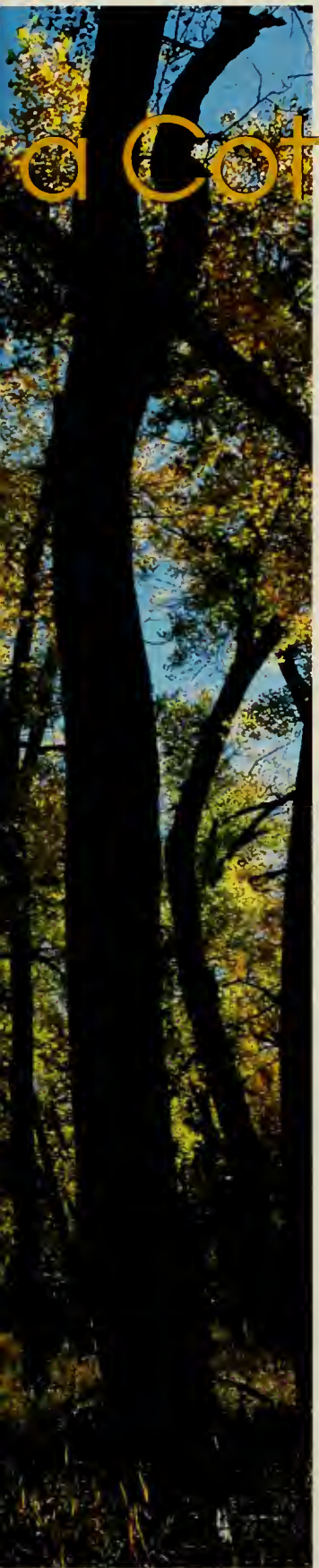


CHUCK HANEY

a Cotton to Cottonwoods

Suburbanites complain about the mess, but out on the plains where few trees grow, cottonwoods offer vital shade and wildlife habitat.

by Bruce Auchly

Cottonwood seeds await a breeze.

IF THE COTTONWOOD were the predominant tree east of the Mississippi River, American history, literature, even sports might have taken on a different flavor. Picture schoolchildren learning the poem, "Under the spreading cottonwood tree, the village smithy stands." Would George Washington have "fessed up" to cutting down a cottonwood tree? Maybe Babe Ruth would have whacked home run number 60 with a cottonwood bat.

Instead, botany and climate have conspired to make the cottonwood the major tree of the American plains where few people live. So it's underappreciated; or, maybe not.

In 1995, a quiet Great Falls neighborhood erupted when several residents circulated a petition to force a neighbor to cut down five cottonwoods because their floating, feathery (well, cottonlike) seeds were clogging up screens and gutters and noses. The petition drive eventually failed—perhaps, as the city forester said at the time, because people who live on the plains appreciate their trees and the difficulty it takes to grow them in this climate.

Yet, cottonwoods along some of Montana's rivers and elsewhere throughout the West are slowly disappearing, and that could have devastating effects on wildlife. "In the West," says Paul Hansen of the University of Montana, "One to five percent of the landscape is riparian, yet seventy-five percent of wildlife is associated with riparian areas."

As any good whitetail hunter knows, riverbottoms with brush and trees grow big deer. And

where there are trees and rivers there are beaver. Then there are the animals we don't hunt or trap, like voles, bats, and chipmunks. And, because cottonwoods are found near water, they are the perfect rest and refueling stop for "neotropical migrants," birds that breed in northern latitudes but winter in Mexico and beyond. To imagine what these birds could face in a landscape devoid of riparian forests, think of driving cross-country on an interstate highway where the only gas stations are 500 miles apart with no exits in between. One could only hope the gas gauge and bladder don't give out! In Montana, cottonwoods are gas stations and rest stops along the avian interstate system.

W. STEVE SHERMAN

Cottonwoods are a major component of most riverbottom plant communities, providing habitat for everything from black bears (right) to Merriam's turkeys (above).

Montana lays claim to three cottonwood species: black (*Populus trichocarpa*), Great Plains (*Populus deltoides*), and narrowleaf (*Populus angustifolia*). Black cottonwood is the dominant family member west of the Continental Divide, although it is also found east of the divide. According to Hansen, narrowleaf and Great Plains cottonwoods are restricted to areas east of the divide and found at altitudes between 2,000 and 6,600 feet. In central and eastern Montana, black cottonwood tends to grow at higher elevations than the narrowleaf variety, which grows at higher elevations than the Great Plains version.

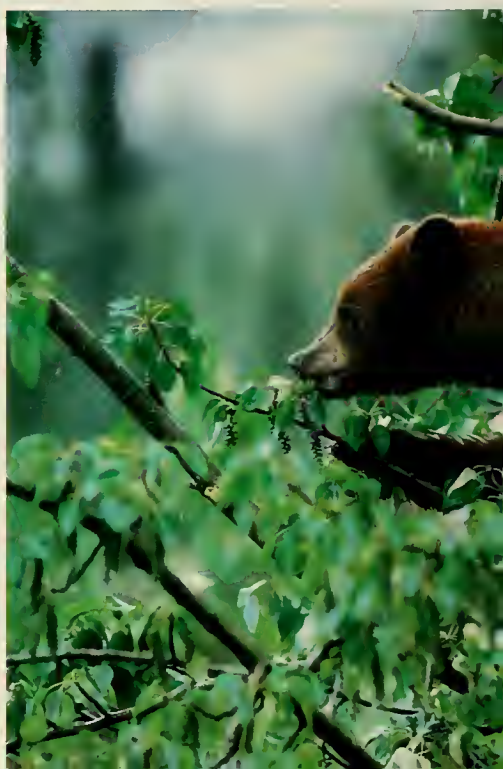
Modern knowledge about cottonwoods in Montana starts, like so much other natural science, with Lewis and Clark. Along the Teton River on June 6, 1805, William Clark noted cottonwood trees with narrow leaves like those of the wild cherry. A few days later Meriwether Lewis described the tree, and hence is given the honor of discovering the narrowleaf species. That same month, the expedition set about portaging the Great Falls of the Missouri with cottonwood dugouts mounted on wheels carved from cottonwood.

West of the divide, Lewis was the first person to collect specimens of black cottonwood, which he took back to Philadelphia. The expedition members were already well acquainted with the Great Plains cottonwood, having used it to build their 1804-05 winter fort in present-day North Dakota. Of all the western trees encountered by the expedition, no other contributed as much to the party's success, says Paul Cutright in *Lewis & Clark: Pioneering Naturalists*: "Though we think it probable that they would have successfully crossed the continent without the cottonwood, don't ask us how!"

The Indians Lewis and Clark met did more than appreciate the cottonwood, they made it part of their culture. Besides forage for horses, Indians tapped the tree in spring for sap to eat, extracted a yellow dye from the buds, and concocted medicines from the leaves, bark, and buds. Blackfeet warriors even rubbed themselves with the sap to conceal their human scent when stealing enemy horses.

This native understanding of the tree that survives and thrives in the extreme climate of the plains did not immediately pass from one culture to another. European settlers, accustomed to omnipresent trees, were shocked when entering first the treeless tallgrass prairie of the Midwest and finally, as they neared the Rocky Mountains, the shortgrass prairie. But as nineteenth century settlers headed west and passed the 96th meridian (Montana's eastern border lies at the 104th parallel), they soon learned to look for cottonwoods: The trees grew near water, a sign of grass for livestock as well as timber for repairs, firewood, shade, even food.

"Settlers once cut white inner pulp from the tree and made a delicacy called cottonwood ice cream; but no one remembers the recipe, and people no longer know how to eat a cottonwood," writes William Least Heat Moon in *PrairyErth*.



BILL JONES AT 81 has seen a tree or two grow in his lifetime. Jones ranches along Blackleaf Creek west of Bynum in a house surrounded by cottonwoods and willows. "There's something about cottonwoods," he says. "We're used to willows and brush along the creek. But there's something about these cottonwoods that reach up 25 to 30 feet above the brush."

Jones grew up on a treeless homestead about 20 miles away. "We planted a nice shelterbelt of poplar, box elder, Chinese elm, green ash, and black willows." He figures only people who have lived on the plains can cherish trees because there are so few. Where trees are commonplace, Jones says, a person might love them but not appreciate what they mean or what an individual plant can do. Along the creek by his current home, Jones sees pheasants and partridge. He figures it's the cottonwoods. He's right, but it's more.

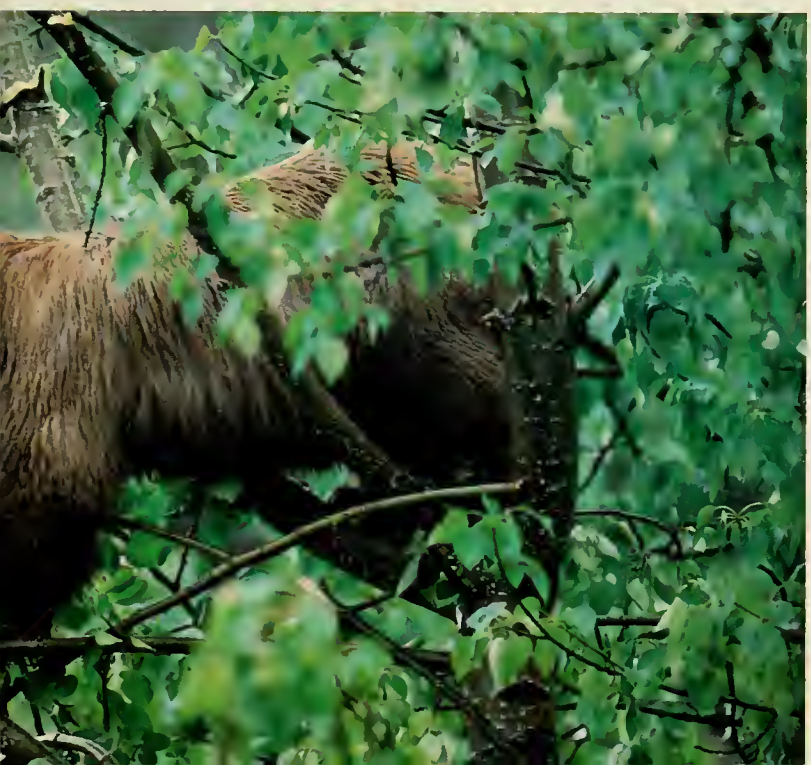
"It's kind of hard to separate out cottonwoods from riparian areas," says FWP wildlife biologist Dennis Flath. "Riparian habitat has major importance for wildlife. Seventy percent of neotropical birds use riparian areas. In the floodplain you'll find all the amphibians and reptiles. For fisheries, cottonwoods provide bank stabilization and shading."

Flath, stationed in Bozeman, has spent years studying riparian areas. He's currently researching the bald eagles of the Yellowstone. Cottonwoods are water-loving trees that can grow taller than 80 feet and live 100 years or more. As towering riverbank sentinels, they make perfect nesting sites for our fish-eating national symbol.

LYNN BACON

Unlike oak, hickory, and walnut trees, cottonwoods do not depend on mammals and birds for seed dispersal. This tree survives despite and because of weather extremes: wind and water. Cottonwood seeds need bare soil and full sunlight to grow. Floods, then, become the perfect cultivator, creating gravel bars and depositing silt on them as flows recede. When a female cottonwood releases its wispy seeds in early summer, a fortunate wind may float nature's cotton candy to the proper germination spot. The seeds have just a handful of weeks to sprout or die. Once sprouted, they cling tenaciously to life. In the first growing season, seedlings can send a taproot three feet down in search of water. Saplings, under perfect conditions, in one year can grow to twice the height of a man.

LANCE R. PE



DONALD M. JONES

Cottonwood forests are logged today for pulp, posts, firewood, and lumber for pallets, water tanks, caskets, paneling, and a variety of other products. Because younger, healthier trees are usually chosen for harvest, there will be fewer of the large, old trees preferred as nest and perch sites by bald eagles, ospreys, hawks, owls, and woodpeckers (like the flicker above) in the future.

JOHN LAMBING

Along the Marias River in north-central Montana, cottonwood seedlings are far less numerous below Tiber Dam than above. Dams limit cottonwood regeneration by preventing the river channel scouring and silt deposition that creates ideal seedbeds.

Water and wind. Floods and breezes. Man hasn't conquered wind, yet. Dams we know about.

Dams, especially those built for flood control, hold back runoff in the early summer when cottonwood seeds need it to scour river channels and create new gravel bars. No floods mean no new gravel bars with just the right amount of silt for the seeds to germinate successfully. By late summer and early fall, when the water is released, the seeds are no longer viable.

"In the Flathead we're not seeing any cottonwood regeneration," says Paul Hansen. "We have to re-educate people about floods. Just as we had to relearn our fire behavior, we have to accept that not all floods are bad."

A similar situation is occurring on the Marias River in north-central Montana. Cottonwood seedlings are far less numerous downstream from Tiber Dam than upstream, according to a 1995 study by a University of Lethbridge scientist. "If the operation of the Tiber Dam continues in the pattern of the past four decades," he concludes, "it is probable that the deficiency of seedling recruitment will continue....This would result in a gradual loss of riparian cottonwoods over the next half-century downstream of Tiber Dam."

Adds Hansen about the West in general: "We're still getting cottonwood regeneration, but less than we were getting before the dams." As the state's main rivers east of the Continental Divide, the Missouri and Yellowstone contain critical wildlife habitat. Both rivers sport healthy cottonwood groves, though threats to the trees' future are real. The Yellowstone has no major dams along its entire 670-mile stretch. The Missouri has lots of dams and their effect on cottonwoods is being studied.

In 1992, scientists with the U.S. Geological Survey (USGS) began to look at cottonwood growth on the Wild and Scenic section of the Missouri River between Fort Benton and the Fred Robinson Bridge—about 150 miles. The area does not have a lot of cottonwood groves, although Mike Scott of the USGS believes there never were many.

"Extensive cottonwood forests need a wide, meandering channel," Scott says. The Wild and Scenic Missouri is anything but that. The river narrows as it runs through this area because the constrained valley is geologically new. Geologists believe the Missouri River once turned north at Little Sandy Creek, just downstream from Fort Benton, and ran through the present-day towns of Big Sandy and Havre. Then it followed the valley now occupied by the Milk River eastward, rejoining the present Missouri channel east of Glasgow. Over thousands of years, a series of ice age glaciers created a new river channel, with the last ice age about 10,000 to 12,000 years ago pushing the river south on its current course.

The few exceptions to the Missouri's narrow channel are at the mouths of tributaries like the Judith River, where extensive cottonwood groves thrive. Without an actively meandering channel, exceptionally large floods are needed to provide the right conditions for regeneration. "In constrained sites," Scott says, "it takes a really big flood to establish a good seedbed."

To understand how a big flood helps, picture a bathtub as a river and the dirt rings as cottonwood seedlings. The ring that gets covered every time the bathtub is filled will get wiped out. But the ring from that Saturday night when you were filthy and filled the tub near the brim will remain. Exceptional floods can prepare seedbeds high enough in the Missouri's narrow channel that the seedlings will escape high water and ice in following years.

On the Missouri those are floods measured as greater than 50,000 cubic feet per second at the Fort Benton river gauge. "There have been twelve of that size since the 1890s," Scott says. "The biggest flood on record was in 1908 when the flow measured 107,000 cfs."

The last flood close to 50,000 cfs was in 1981. The top five flood years were 1908, 1953 (75,000 cfs), 1964 (69,000 cfs), 1892 (66,000 cfs), and 1975 (59,000 cfs). "In normal years the peak spring runoff reaches about 15,000 cfs," he says. For cottonwood regrowth on the Missouri, dams are not the villains they are elsewhere. Scott says that dams have changed the river's flows and in turn have influenced cottonwood growth, but it's not clear that the trees are declining on the river.

"Cottonwoods along the Wild and Scenic Missouri are much the way they were described in Lewis and Clark's time," Scott says. "Above Cow Creek [25 miles upstream of the Robinson Bridge] Lewis and Clark said there was no timber except pines. The same above Arrow Creek [80 miles downstream from Fort Benton]. Above Coal Banks [42 miles below Fort Benton] there was more timber and at the Marias, they were into many cottonwoods."

While floods are necessary for cottonwoods to have a good start, it takes more than high water to grow a big tree. Winter ice and summer cattle grazing are tough on the young plants. "We think that ice is limiting how close they can grow to the river," Scott says. The term is ice scouring. On the Missouri, ice jams build up each winter. Like an SOS cleaning pad, they have the potential to scour the river banks clean. Mature trees can be pushed over by an ice jam; survivors show gouges and cuts from ice. Seedlings don't stand a chance.

Cattle grazing along the riverbanks in summer also can reduce seedling survival. The USGS team, in cooperation with the Bureau of Land Management (BLM), is including grazing in its cottonwood regeneration study. The BLM administers both recreation and grazing on the Wild and Scenic Missouri.

Joe Frazier, hydrologist with the BLM in Lewistown, feels that grazing does play a role in limiting cottonwoods along this section of river. "For generations," he says, "ranchers and farmers have grown wheat, barley, or hay on the uplands and grazed the rough breaks along the river during summer. Because the breaks are so steep and rugged, about the only water source for their livestock is the river itself. The cattle typically spend summer next to the river trampling and eating the vegetation until they are moved back to the uplands after the fall harvest."

Ice, floods, drought, dams, disease, and summer grazing are all taking their toll on the cottonwoods, willows, and other riparian species, says Frazier. "Our data show a huge difference between ungrazed areas or those with winter use only and those with continual summer use. Seedlings are established every year, but in summer-grazed areas they never grow to the sapling or pole stage." Frazier fears that hunters, floaters, ranchers, and birdwatchers are all facing an extended period when there will be virtually no mature trees.

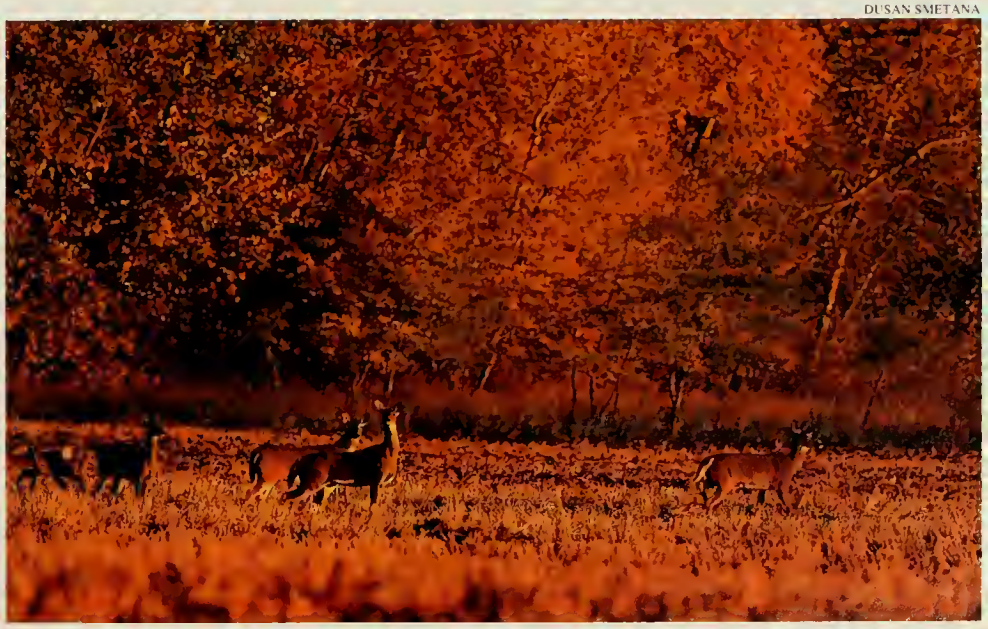
What is a riverbank with fewer cottonwoods? On a morning in mid-May at Woodhawk Landing about 20 miles upstream from Fred Robinson Bridge, Frazier posed the question in a statement: "Close your eyes and listen." Then block out the orioles, yellow-rumped warblers, rufous-sided towhees, yellow warblers, and house wrens.

Silence is not a pretty sight.

But birds are not the only beneficiaries of cottonwoods. For hundreds of years, we have relied on them for fuel, forage, medicine, shelter, shade, and comfort. Today, despite the grumblings of suburbanites, we all benefit directly or indirectly from these hardy, drought-resistant trees. Perhaps it's time to give cottonwoods the respect they deserve. ■

RIPARIAN AREAS and cottonwoods will be the focus of a symposium sponsored by the Society of Wetland Scientists (SWS) at Montana State University in Bozeman June 3 to June 5. For registration information call MSU conference services at (406) 994-3333. For the complete agenda or to register electronically, use the SWS home page at *http://www.sws.org*

DUSAN SMETANA



White-tailed deer emerge from cottonwood groves to feed in adjoining fields, but retreat to the shelter of the trees when danger threatens.

A Gathering of

by DENNIS FLATH

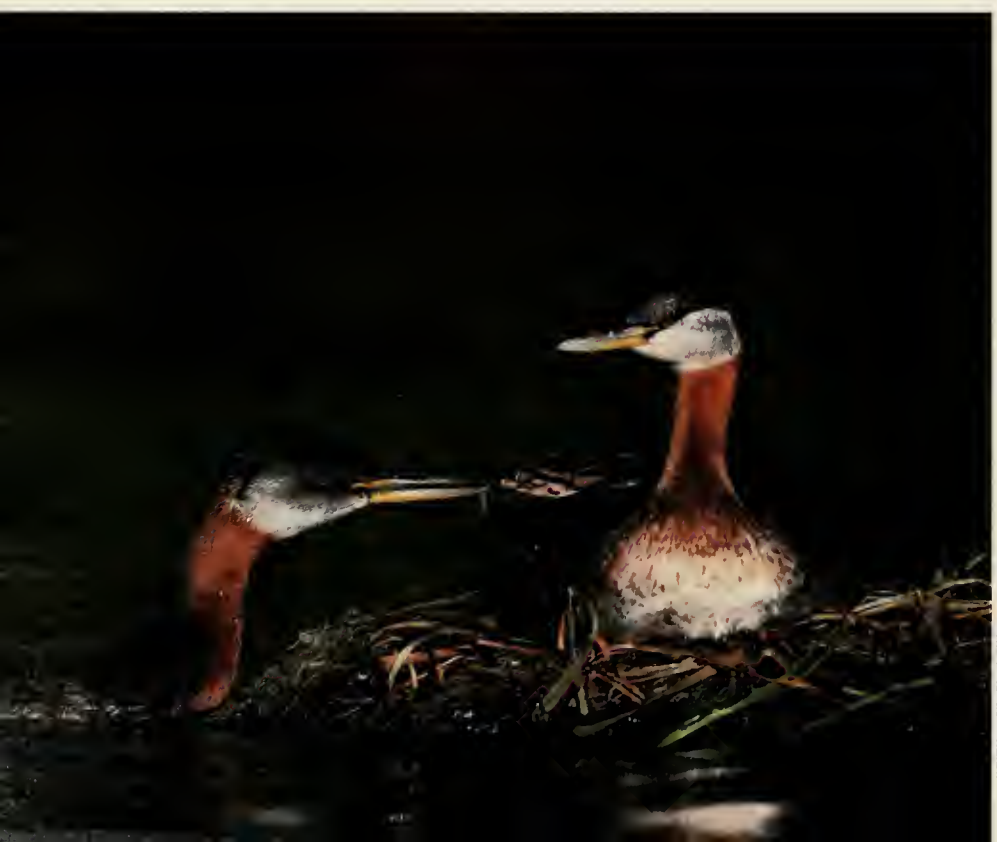
AT MONO LAKE in Inyo County, California, an estimated 800,000 eared grebes arrive each September to feed on an enormous population of brine shrimp. Migrating at night, flocks of grebes slip in under cover of darkness, building to a density that blackens the lake's 60-square-mile surface. It's one of the most impressive concentrations of a single wildlife species in the West.

Some biologists believe this gathering may represent up to 25% of the eared grebes in North America. Their presence in such numbers, not surprisingly, draws birders from near and far. Then in November and December the grebes begin to leave, disappearing at night as mysteriously as they came, continuing on to wintering areas in Mexico and Central America.

Grebes are a unique group of birds, adapted to a way of life that is thoroughly dependent on water. Worldwide there are 21 species. Seven of those occur in North America, with six found in Montana. Three of Montana's species, the eared, horned, and red-necked grebes, also occur in Europe and Asia.

Relatively little is known about grebes. In perusing the literature, one often finds the term "mystery" associated with them. Perhaps it is partly because many species are secretive and difficult to study, or because they spend so much time underwater where we can't see them. The eared grebe is the most common and familiar member of the grebe family found in Montana and the United States. Thus, by default, we possess better knowledge of this species than the others.

BELOW: *To protect them from predators, grebe chicks are brooded on their parents' backs until they are several weeks old. More than 100 pairs of red-necked grebes nest each summer at Georgetown Lake near Anaconda.*



KEITH A. SZAFRANSKI

RIGHT: *At Freezout Lake Wildlife Management Area west of Great Falls, eared grebes tread water in a "penguin dance" mating display.*

Grebes

KEITH A. SZAFRANSKI

Red-necked grebe

The red-necked grebe has a bright-chestnut neck and upper breast, with light gray cheek patches and a black crown. The bill, which is blackish above and yellow below, appears heavier than in the horned and eared grebes. Red-necked grebes nest in loose colonies, with nests spaced out enough to provide distinct territories for each pair. Nest densities are roughly intermediate between those of horned and eared grebes. Nests are usually built in exposed areas with little effort made to hide them. In North America the breeding range extends from Alaska and Canada south to central Washington, Montana, North Dakota, and the Great Lakes region. Red-necked grebes have been documented at numerous sites in western Montana. The best places to see them are Georgetown Lake and Ninepipe and Pablo reservoirs. At Georgetown, the last inventory of red-necked grebes (August 11, 1994) tallied 248 adults and 110 young. These grebes winter along both coasts on saltwater, from the Aleutians to Mexico and from Newfoundland to Florida.

JAN L. WASSINK

KEITH A. SZAFRANSKI

Well adapted for swimming, the grebe's toes are lobed and partially webbed.

Grebes have been around a long time. Fossil remains have been found in Miocene deposits from 25 million years ago. Although it has been popular in times past to consider loons and grebes together because of some similarities, grebes are not related to loons. The resemblance is apparently the result of convergent evolution, a process wherein widely differing lineages of animals become similar over time through adaptation to similar habitats.

Anatomically, however, grebes and loons have major differences. Loons have a large keel to which the flight muscles are attached and are correspondingly strong fliers. Grebes have a small keel and are weak fliers. Feather structure, too, is different, with grebes having softer, silkier plumage. Grebes were highly sought by market hunters in the days when bird feathers were in vogue for the millinery trade.

Convergent evolution has also molded grebe anatomy to take on some characteristics reminiscent of penguins. There is even a flightless grebe, the Atitlan grebe in the Guatemalan highlands. Grebes, like penguins, have their legs positioned far back on the body. However, while penguins can stand upright on land, grebes cannot. They are helpless on land, and need a large enough water body to serve as a "runway" for their flapping takeoff. Periodically, grebes may land on wet pavement, thinking it is water. Once grounded they are doomed unless rescued and transported to a suitable liquid runway.

Grebes have unique feet. The bones of the lower leg are laterally compressed, with the leading edge sharply tapered. The result is a lower leg-foot combination that offers little more resistance than a knife blade when passing through the water on the forward stroke. The toes are lobed toward the end and webbed along the basal third. On the backward (propulsive) stroke, the toes rotate about 90 degrees and powerful extensor muscles provide rapid acceleration. Grebes use their feet alternately when swimming on the surface but in unison when swimming underwater. Located at the rear of the bird, the legs are ideally situated to propel the bird along when it is submerged. While grebes customarily use only their feet for underwater propulsion, during escape dives they use both feet and wings in the manner of swimming penguins.

Grebes are quick to dive when danger threatens. If a grebe is uncertain about the risk involved, it may slowly sink rather than make a sudden dive. This controlled buoyancy is also used when grebes surface. They may suddenly pop up like a cork, or slowly appear at the surface like a submarine coming up periscope first.

Clark's, western, horned, and eared grebes have red eyes. It has been speculated that their red eyes, like amber fog lights on a car, may improve visibility in the underwater gloom. Why pied-billed and red-necked grebes have dark eyes, however, remains unknown.

Grebes feed on fish, insects and other invertebrates, and sometimes small amounts of aquatic vegetation. Diet varies among species, with each adapted to using a particular regime of available food—a process known to biologists as resource partitioning. The same is true in selection of nest sites. Some species prefer lots of open water, while others choose more secluded surroundings with emergent vegetation for cover. All grebes build floating nests composed of aquatic vegetation. The nests, which are anchored to emergent vegetation or against the bottom in shallow areas, are generally messy affairs. While they are usually soaked through so that the eggs are wet, decaying vegetation provides heat to the eggs and assists in incubation.

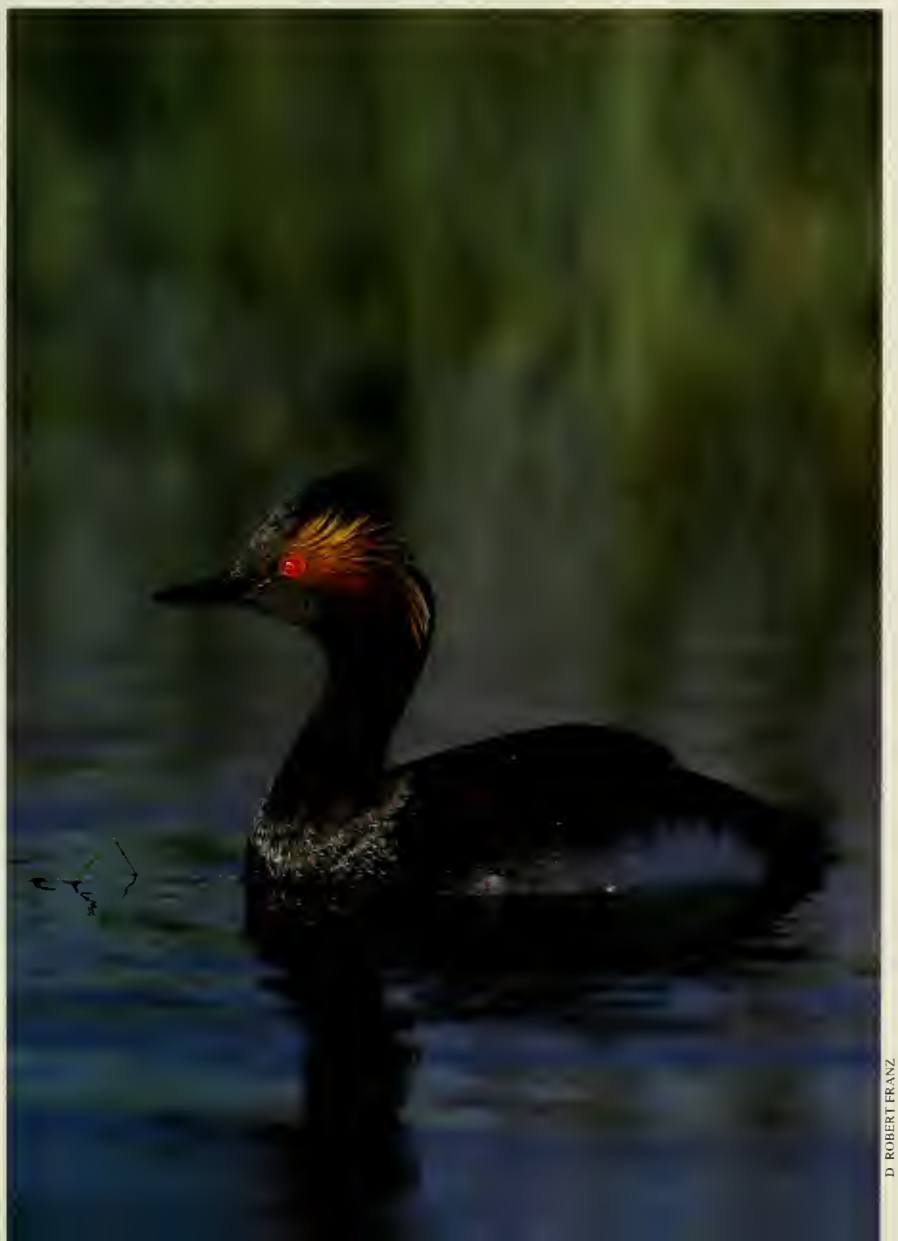
Interestingly, grebes eat their own feathers. The feathers form an auxiliary lining for the gizzard, and may hold back objects such as fish bones until they are soft enough to digest.

Young grebes (with the exception of the western and Clark's) are strikingly marked with black and white stripes on the head and neck. Like loon chicks, they frequently hitch a ride on their mother's back.

While we don't have massive concentrations of migrating grebes in Montana, there are numerous places where one can see them in good numbers and probably identify two to four

JAN L WASSINK

Adult grebes feed bits of feathers to their young, a behavior unique in the avian world.



D ROBERT FRANZ

Eared Grebe

The eared grebe, Montana's most common species, is also known as the black-necked grebe in its European and Asian range. In springtime breeding plumage, it has a black neck and upper breast, with bright tawny-orange crests ("ears") extending back along the sides of the head behind the eye. The bill appears slightly upturned and is shorter than the head. Eared grebes occur throughout Montana in medium-sized to large lakes containing shallow areas with emergent vegetation. They nest in compact colonies that often harbor up to 200 pairs. Nests are well-hidden platforms set so low in the water that the eggs are usually wet. In North America the eared grebe is a western species, breeding from central Alberta south to central Texas, and from Minnesota west to the Cascade Range. Inland, they winter from northern Utah to Central America; along the Pacific Coast they winter from Vancouver Island to Guatemala.

species at a time. Wildlife management areas like Ninepipe and Freezout Lake, and national wildlife refuges such as Benton Lake, Bowdoin, Medicine Lake, and Lee Metcalf are always a good bet. For those willing to travel a bit farther, up to 400,000 eared grebes can be seen at Farmington Bay in the Great Salt Lake during fall migration.

JOHN G OBREY JR

Clark's grebe

The Clark's grebe, once considered a color phase of the western grebe, is now classified as a distinct species. In the western, the black crown extends below the eye, while in the Clark's it stops above the eye. Distribution of the two species is similar, but the Clark's grebe is much less common than the western in the northern and eastern part of the range. Unlike other grebe chicks, young western and Clark's grebes do not have stripes on the head and neck.

Horned grebe

KEITH A SZAFRANSKI

Like the eared grebe, the horned has a dense tuft of buffy-chestnut feathers on either side of the head. These tufts stand out above the head more than in the eared grebe, but are not always a reliable field mark. The best distinguishing characteristic in springtime is the horned grebe's bright-chestnut neck and upper breast (compared with black in the eared). Horned grebes prefer small ponds with open water where they can defend their territory visually. They seem to be solitary nesters, often using sheltered areas and bays with emergent vegetation to hide the nests (although some nests may be exposed). The nest is little more than a soggy heap of decaying vegetation. Nesting horned grebes are aggressive toward intruders. Most breeding occurs in northern Canada and Alaska. They are found in about a third of Montana, with the northern counties and the Flathead Valley being the best places to see them. Horned grebes winter on saltwater, from the Aleutians to Mexico on the Pacific Coast, and from Newfoundland to Mexico on the Atlantic and Gulf coasts.

KEITH A. SZAFRANSKI

Western Grebe

The largest of the North American grebes, the western has a distinctive black-and-white pattern on its long, swan-like neck. The courtship ritual, in which two birds approach one another, heads low and crests erect, steals the show from other water and marsh birds. They dip their beaks and shake them with a rapid clicking, then turn sideways, rise upright, arch their wings, bend their necks in an S-curve, and paddle vigorously across the water. The run ends in a coordinated dive. This display may be performed by a pair or a small group. Western grebes breed from central Canada south to Colorado and from Minnesota west to Washington and California. Most winter on the Pacific Coast, with some found inland in western Texas and along the Gulf Coast.

KEITH A. SZAFRANSKI

Pied-billed Grebe

Perhaps the least social of the grebes, the pied-billed prefers secluded habitats for nesting and requires 0.5 to 10 acres for each nesting territory. Because of this, few pairs will be seen on any water body unless it is a large lake with extensive shallows. Pied-billed grebes use a wide variety of pond types, but always pick sites with heavy emergent vegetation. They breed from southern Canada all through the lower 48 states and as far south as Argentina. Highest densities are found in western Minnesota, North Dakota, Saskatchewan, and western Manitoba. Wetland drainage poses the greatest danger for this species, mostly in the Northeast and the Great Lakes regions. Pied-billed grebes winter along the West Coast, across the southern states, and farther south.

MAYFLY MAGIC

by E. Neale Streeks

TO NON-ANGLERS, the mayfly might be just another bug cleaned out of a mosquito zapper, but to dedicated river floaters and especially flyfishers this graceful insect is a prominent player in river valley life and a major ecological link between algae and graphite-flexing trout. Mayflies are a diverse aquatic insect group, with more than 200 species found across the Rocky Mountain West. Fossil evidence indicates they have been on the planet for at least 270 million years. Whatever was rising to them then was anything but a trout!

Although a few mayfly species are quite colorful, sporting bright yellows, greens, and even pinks, most are more subdued, perhaps to aid in avoiding predators. They range in size from 1/8 to 1/2 inch in length. Their upswept wings and slender bodies make them readily identifiable as they drift on the current or fly slowly above the riverbank. The fact that they don't bite (or even have working mouthparts) might ease the minds of those who may associ-

AL TROTH

ate streamside outings with biting bugs.

The Latin name for the mayfly order—Ephemeroptera—denotes their very short or "ephemeral" existence as winged adults. Mayflies are unique in the insect world in having two separate winged stages: The first stage is known as the "dun" or subimago, while the second stage, which follows within a few hours or a few days, is known as the "spinner" or imago.

While most people are more familiar with the winged stages of this beautiful order of aquatic insects, the longer nymphal stage is also of great importance to a stream's food chain, not to mention the gastronomic contentment of trout. Let's begin by looking at the mayfly life cycle, beginning with the egg-laying adult.

Mayflies lay their eggs in one of three ways. Some species drop egg clusters from the air as they fly just above the water. Most, however, dip to the water, dropping them there. The females in this case generally die on the water with wings spread wide.

DUSAN SMETANA

AL TROTH

AL TROTH

ABOVE: *Mayfly life cycles define the fishing calendar for many Montana anglers.* **TOP RIGHT:** *A dark green drake spinner prepares to deposit its eggs.* **ABOVE RIGHT:** *The* Heptagenia *nymph's broad, flat body helps it cling to rocks in rapid water.*

These are referred to by anglers as "spent" mayflies or spinners. In a few species, mayflies crawl underwater and paste their eggs on the streambed, on submerged logs or, if you happen to be wade fishing in a riffle at just the right time, on your waders. Dominant here are those belonging to the genus *Baetis*, which make up a large share of Montana's flyfishing possibilities.

Depending on species, the eggs hatch anywhere from a few minutes to a few months later. The nymphs of most species are primary herbivores in river, stream, and lake food chains, eating microscopic algae, moss, and some plants. Others are "detritivores" that consume bits of plant or animal matter. A few are carnivorous, pursuing other nymphs in a hidden world of high-stakes hide and seek.

Mayfly nymphs are categorized into four groups, reflecting their shape and function: swimmers, crawlers, clingers, and burrowers. Swimming nymphs are streamlined and active, favoring slower water habitats and weedbeds. Crawlers are stockier with stronger legs, and are better adapted to ambling in quicker waters. Clingers are broad and flat, designed for staying attached to rocks in fast flows. Burrowers dig little tunnels in semi-silted bottoms and are largely unavailable to trout except when emerging. Most of the largest mayflies are burrowers, including the brown drakes and *Ephoron album*, the "white fly," which hatches just at dusk.

In the evening an event known as "behavioral drift" takes place, in which the nymphs let go and wash downstream a short distance. A major drift takes place just after sunset, and more drifting occurs through the night. Another major drift period occurs just before dawn. This downstream migration helps spread populations and perhaps avert total devastation in times of flood and drought by constantly repopulating lower reaches of river. The mature winged females then tend to migrate upstream when mating and laying eggs, compensating for the downstream drift of the nymphs.

While most mayfly nymphs reach maturity in about a year, some take half that time or less. *Baetis* and *Callibaetis* mayflies (prominent in Montana rivers and lakes) are notable here. A few species take two years to mature. The nymphs, assuming they evade trout and other predaceous nymphs, go through 20 or more molts, or instars, as they grow.

When the nymphs are ready to hatch into winged flies or duns, their wing pads become dark, almost black. Prior to hatching they become restless; some swim back and forth to the surface, while others migrate to stream edges where the current is slower and the water shallower. In most species, the nymphs swim to the surface to hatch. A few species crawl out on streamside rocks or brush, which saves them from fish predation. A few others exit their

nymphal shucks before getting to the surface, making that last aquatic trip as fully winged duns.

When nymphs swim to the surface to hatch, their nymphal shuck or exoskeleton splits and the winged dun struggles out and steps up on top of the water. What was formerly the roof of the nymph's world is now the floor of the dun's. It stands on the surface of the river on its six legs while its wings fully unfurl, becoming adjusted to its new form and life. The dun at this point has subdued colors and smoky-hued wings.

This period of emergence is when the mayfly is most vulnerable to predation by fish and birds, and also when it is most imitated by fly-tying fishermen. Some mayflies ride the current a long time, availing themselves to trout wholesale. Others take off almost immediately. In spring and fall, most hatches occur in the afternoon, the warmest part of the day. Spring and fall mayflies tend to be dark in color, which helps them absorb heat. During midsummer, hatches push toward dawn and dusk. Since mayflies have no mouths and can't eat or drink, they avoid the heat of day, minimizing dehydration. Additionally, most summer species are light-colored to reflect the sun's rays.

After leaving the water, the duns head for streamside foliage to rest, hide in the shade, and molt their final skin or exoskeleton. This last molt may take place in a few hours or may be delayed up to a couple of days, again depending on species. The "trico" (tiny white-winged black mayfly) is an example of a species that makes the transformation from dun to spinner quickly. The prolific hatch and resulting spinner fall, highly publicized in regional flyfishing literature, occurs daily between the months of July to early September, a full two months. The emergence starts in early morning and lasts until about 11:00 a.m. each day.

Generally, the largest mayflies hatch for the shortest seasonal duration, as short as a week to 10 days, and usually at high water or twilight—times that mask them a bit from predation. Smaller species as a rule hatch for

F. NEALE STREEKS

Left: *Heavy mayfly hatches bring trout to the surface in steady, predictable rise patterns—every flyfisher's dream.* **Below:** *Mayfly imitations include (beginning with the large fly at left and proceeding clockwise) the Royal Wulff, Humpy, Adams, Prince Nymph, Trico, and Hare's Ear.*

STEVEN AKRE

longer periods, in greater numbers, and in better fishing conditions—low, clear water.

After the final molt, the body color and sheen become brighter, the wings clear. Male spinners, which have very large eyes and long forelegs and tails, swarm over riverbanks, riffles, and even roads (apparently a winding ribbon of concrete appears much like a river to a mayfly). Their up-and-down flying motion, often referred to as a dance, is most interesting to watch. Each species has its own slight variation in both dance pattern and stream location. This dance, magnified by large numbers of flies all catching the last light of day or morning sun in their glassy wings, weaves a tapestry of motion that has to be seen to be appreciated. With several species of mayflies dancing at different altitudes, swallows and nighthawks wheeling, and trout rising, the whole river valley seems alive in a celebration of seasonal plenty.

Some mayfly spinners line up over the stream edges. Others are out over midstream riffles and rapids, 5 to 50 feet above the water. Females fly into these groups of dancing males, where they are quickly seized by one of the many competitors. Mating takes place in mid-air. Females then hover over the water in preparation for egg laying.

Riverside spider webs are great places to check the current hatches. Most female spinners die slowly on the river, becoming "spent" on the ocean-bound waters, their clear wings and trim bodies at the mercy of currents and trout. Trout like the spent mayflies just about as well as the duns, since they can no longer fly away. Trout sipping spinners often slide over to the shallowest edgewaters and tailout flats. Here they can feed at leisure without fighting much current. Look closely along shallow banks before wading in!

To the flyfisher, mayflies are the foundation of the sport. Sure, there are midge, caddis, and stonefly hatches to imitate, plus big stuff like sculpins and crayfish. But no other insect presents quite the same alluring scene as a heavy mayfly hatch. The concentrated hatches and spinner falls bring trout to the surface in a sure and steady rise pattern, creating ideal fishing conditions. While the sight of hundreds of graceful duns bouncing down clear currents may be the stuff of flyfishers' dreams, it's equally intriguing between hatches to drift nymph imitations through suspected trout lies.

Coming to understand the different mayfly species, seasonal niches, emergence timeframes, and micro-environments takes years, if not a lifetime, to understand. *Baetis*, or blue-winged olives, hatch from mid-April to June; pale morning duns from late June into August; the "white fly" from late August to early October; then, more *Baetis* well into November. This seasonal order—a flyfisher's calendar—goes on every year with little variation.

Knowing that a certain hatch will start at 8:00 a.m. and continue for two hours makes it easier for an angler to capitalize on a river's most rewarding fishing moments. The dry fly picture is never more focused than when a good mayfly hatch or spinner fall is on. The trout know that dinner is served and rise repeatedly, rhythmically. The angler can see many trout and even follow them visually, as they now hover just beneath the surface. Why do the biggest "risers" always seem to be in the most difficult casting situations? Perhaps trout know more than we think!

Few non-anglers come to understand the river community as well as an entomologist or avid flyfisher. Those who know and value the cycles of aquatic insect life are in tune with moving water and its hidden dramas. They know that swallows return from South America just in time for the first *Baetis* hatches in spring...that gulls show up to feast on salmonflies in the Smith River canyon, as do raccoons, robins, and even black bears...that western tanagers migrate up river valleys at a time when hatches are numerous...that migrating ducks and geese can be seen plucking autumn mayflies from steel-gray glides of the Missouri in late October. They also know that mayflies, because of their sensitivity to water temperature and pollution, are good barometers of water quality and stream health.

There's a lot of magic surrounding the mayfly, centuries of angling literature, and a world rimmed by scenic valley landscapes. Maybe it's just the intrinsic beauty of these delicate waterborne flies. Or is it...those big rising trout? ■

E. NEALE STREEKS

After laying their eggs, most mayfly spinners slowly die on the water with wings outstretched. Trout like these "spent" mayflies because they can no longer escape.

NEAL & MARY JANE MISHLER

SACRED GROUND

ULM PISHKUN STATE PARK

LUCILLE LUNDIN

by DEBRA JO WILLIAMS

THIS IS BUFFALO COUNTRY. If you listen intently enough, you can hear the pounding of a 10,000 buffalo hooves. If you look into the past, you can imagine Native Americans of long ago leading buffalo off the edge of a cliff to their deaths. Here you can still find buffalo bones among the native grasses. If you know where to look, you might even discover rock piles the aboriginal people used for drive lanes, or a primitive trail like the one leading to the ancient spring below the cliff face.

LANDS LEGACY

Much of Ulm Pishkun State Park remains as it was when buffalo roamed Montana. In the spring, the aroma of yarrow and sage mingles with wild rose. Prairie dog mounds dot the plain. Snowberry and chokecherry—used by native peoples to make pemmican, a mixture of berries and buffalo meat—still cleave to the hillside.

Ancient sights. The same sights the Indians viewed a thousand years ago as they stood on the cliff overlooking the Sun and Missouri river valleys, with the Highwood and Belt mountains ascending to the east and south and Square Butte glowing in the afternoon light.

The sense of the place lingers. The appeal of Ulm Pishkun State Park is that this site has endured. There were thousands of buffalo jump sites around the western states. Some have survived, but most have been destroyed or forgotten.

On a cool day last January I stood on this ancient cliff at the Ulm Pishkun site with Dan Smith, FWP park operations specialist in Great Falls. As we descended a trail to a boulder-strewn shelf below, Smith explained the park's history. "From the beginning, turning 170 acres into a state park in 1972 was a minor miracle," he said. "This is a story not just of the Indians, who've been coming here for a long time, but of the dedication of a few people, starting with Earl Monroe in the 1940s. Earl purchased an agricultural lease from the Department of State Lands, now the Department of Natural Resources and Conservation. His goal was to preserve the buffalo jump."

In the ensuing years, a consortium of interests including the Ulm Pishkun Preservation Committee, several Native American tribes, the Cascade Historical Society, the High Noon Optimist Club, and FWP continued to drive the process forward.

The latest addition to Ulm Pishkun State Park was as unexpected as it was welcome, says Doug Monger, assistant administrator of FWP's Parks Division in Helena. Ron and Lou Ann Lords, who own land adjacent to the pishkun, were interested in selling part of it to provide a suitable site for the park's planned interpretive center. Ron Lords, who is part Blackfeet, felt that the land is a special place and should be preserved. FWP did not have funding for an outright purchase, but was able to acquire 1,232 acres of the Lords property through a complex land trade.

According to Monger, building the interpretive center on the Lords land below the cliff face dovetails with the feelings of an advisory council representing Montana's Native American tribes and will solve road and soil stability problems. Previous plans for an interpretive center on the plateau above the cliff were not acceptable to the tribes, says Blackfeet tribal member Al Reevis. "The Indian people feel that this is the time for them to tell their story, but not on top of the pishkun. My grandfather taught me that the Ulm Pishkun is holy ground. We look at all animals as having souls, as equal to man. To kill a buffalo is spiritual because the buffalo took care of us. We need to respect the buffalo jump and build the center below the cliff."

Monger envisions the center as a place where Native Americans can teach Native American culture to Indians and non-Indians alike. "The buffalo jump is an important heritage. It ties us to the Indian culture, the religion, and the honorable past of the Native American," he says.

For Tony Incashola, director of the Salish Culture Committee, the center is a bridge that will diminish the gap between Indians and non-Indians. "The Ulm Pishkun Interpretive Center represents a tie to my historical past and to my future because of what being Indian means to me," he says. "My hope is that the center will bring all people together and will be a tool for better understanding. It is important for us to make the events of the past a part of the future for the next generations."

Consequently, the center will provide an opportunity for Native Americans to interpret the site history and significance in their own words, and for tribal elders to teach younger tribal members their language, culture, traditions, and values. "Indian youths will be able to learn about their heritage from elders, and whites will be able to learn about Indian history and what the buffalo culture meant to the Indians," says FWP's Smith. "Great Falls is only 15 miles away, and there are 22,000 school-age youths within a 30-minute drive of the buffalo jump. The center will serve as a living outdoor classroom and field trip site for them."

The center also will provide an opportunity for visitors to learn about the pishkun's more recent history. For example, from the late 1890s to the 1920s, stone masons utilized the site as a source for sandstone construction blocks. (Sandstone quarried from the site was used to build the Presbyterian Church in Helena.) Quarrying had both positive and negative impacts on the prehistoric cultural resources: It may have protected the site by burying some cultural materials under debris, but it also removed portions of the cliff face and may have damaged some pictographs.

A few decades later, between 1945 and 1947, 150 tons of buffalo bones were removed from Ulm Pishkun, crushed, and shipped away for use as a supplement in animal feed. Also, excavation by amateur collectors of prehistoric Native American artifacts began in the 1930s and continued until park establishment in 1972. Since that time, illicit arrowhead collecting and vandalism has been an ongoing problem.

In recent years, excavations by professional archaeologists from

JOHN LAMBING

The buffalo jump at Ulm Pishkun State Park has cultural and historical significance for all Montanans.

ULM PISHKUN STATE PARK

Location: 16 miles southwest of Great Falls.

Size: 1,402 acres.

Access: From Great Falls travel south 10 miles on Interstate 15 to the Ulm exit, then 6 miles north on the Ulm-Vaughn Road.

Management goal: To proteet and preserve the cultural, archaeological, historieal, and natural resources of the pishkun and to provide educational opportunities for the public.

Facilities: The site features an interpretive trail, shelters, picnic tables, and fireplaces.

Season: Open to day-use only, April 15 through October 15.

Miscellaneous: No park entry fee is charged at present. Due to the pishkun's rough terrain, sturdy footwear is recommended for hiking the interpretive trail. Visitors are cautioned to watch for rattlesnakes.

Recreational/educational opportunities: Picknicking, wildlife viewing (there is a protected black-tailed prairie dog town), outdoor photography. An "Evening Atop the Pishkun," featuring live classical music and other entertainment, is sponsored at the site eaeh summer by FWP and Ulm Pishkun Preservation Committee, an arm of the Cascade County Historical Society. Schools and other groups of over 30 members should make advance arrangements by calling (406) 454-5840.

COURTESY OF MONTANA HISTORICAL SOCIETY

As depicted in this diorama, prehistoric people used cliffs like the one at Ulm Pishkun to secure their food supply.

Montana State University have revealed much about the prehistoric people who ran bison over the eliff from 500 to 1500 A.D. The investigating team feels Ulm Pishkun may be one of the largest buffalo jumps in the world (see *Montana Outdoors*, July/August 1993).

The Great Falls business community sees the park as a potential tourist attraction, complementing the existing C.M. Russell Museum and the Lewis and Clark Interpretive Center now being built by the U.S. Forest Service adjacent to Giant Springs State Park in Great Falls. Currently, about 5,000 people visit Ulm Pishkun State Park each year. The new interpretive center at the pishkun, scheduled for completion in spring of 1999, will attraet an estimated 40,000 visitors annually.

Imagine for a moment a thousand buffalo stampeding across the prairie. Ahead of them, a Native American dressed in a buffalo robe jumps over the precipice to a hidden ledge just below. The buffalo, unable to stop, continue on over the cliff. At the bottom are men with spears and bows, ready to finish off the dying buffalo. Women and children are waiting a short distance away with scrapers and knives, ready to skin and cut up the careasses. The provision for their life sustenance has begun.

This is the essence of Ulm Pishkun State Park. ■

Protecting Our Heritage

Those who vandalize state parks are stealing from future generations

story by **Carillon Steorts**, illustrations by **John Potter**

SPRAY PAINTING ON WALLS may seem a long way from scratch graffiti on precious rock art, but it really isn't. While many think vandalism takes place only in urban areas, the truth is it is on the increase everywhere. As more people feel the pressures of city life, the need to escape and recreate in our wild areas and parks increases; so, too, does the risk of destruction and defacement of these areas.

One of the reasons vandalism, particularly graffiti, is moving from urban to rural areas appears to be that as police move in on these crimes in the inner cities, vandalism moves farther from the center. It now seems as though no place is immune. No piece of public land, be it a tiny county park or roadside historic marker, a national or a state park, or your favorite picnic spot or wildlife viewing area, can long stem this blight unless we do something about it.

Every agency has its own way of dealing with vandalism. Montana Fish, Wildlife & Parks has been battling the problem at fishing access sites and state parks for as long as these public facilities have been in existence. In fact, the 1996 theme for Montana's State Parks Poster Contest was "Share With Care—Please Don't Vandalize." By raising awareness, especially in the young, we hope vandalism can be contained and possibly even turned back.

What Vandalism Is

Vandalism includes everything from graffiti to theft to destruction of buildings, trees, equipment, and other objects. In our state parks it has made itself known in every way—graffiti on the walls of historic buildings at Bannack, defaced trees at Chief Plenty Coups, scratched interpretive signs at Council Groves, an arson-caused grass fire at Spring Meadow, a ruined entrance sign at Ulm Pishkun.

Vandalism can be intentional or it can be inadvertent. An example of the latter could be people digging for artifacts on public land. Montana law requires anyone finding artifacts on state-owned lands to report them to the State Historical Preservation Office. Native American remains or burial objects must be reported to the appropriate tribe or tribes. Destroying or removing such items, even inadvertently, is prohibited by federal law and carries severe penalties.

Ken Oravsky, manager of Pictograph Cave State Park near Billings, stresses the importance of leaving artifacts "in situ," or where they are found: "At times people will say they found an artifact and ask if it is useful for research. That's when I say, 'it was until you picked it up.' An artifact's significance is dependent on the area it was found in, what other things it was found with, and the general surroundings of the discovery. Once the artifact is removed from the original site, carbon dating cannot be done as easily or effectively, and much of the history is lost."

What Vandalism Costs

Claire Dean, conservator for Dean & Associates based in Portland, is one of a few people in the United States whose full-time job is the cleanup of valuable archeological sites. "The National Graffiti Information Network," she says, "estimates that some seven billion dollars is spent in this country annually on graffiti-related cleanup."

Removing scratch graffiti, spray paint, and permanent magic marker from pictographs and other precious artifacts is exacting, expensive, and time-consuming, says Dean. "At archeological sites, you can't just go in with chemicals, because if you attack rock art too aggressively, the art can be lost forever. Also, chemicals contaminate rock art and ruin the dating of these precious archeological sites. We are dealing here with irreplaceable resources and once they are gone, they are gone forever."

Statistics for 1995 reveal that 178 incidents of vandalism at Montana state parks cost the state more than $30,000. In many regions these costs were incurred over a three- or four-month summer period. Keep in mind, too, that the monies spent to repair vandalism come out of the general operating budgets of state parks and thus reduce funds available for such things as road grading, new picnic tables, and general improvements. "In 1995 the costs of vandalism in one FWP region alone exceeded by $8,000 the annual budget of two or three small state parks combined," says Oravsky. "When you realize that a 28-cent shotgun shell can cause $500 damage to one sign, you can begin to see how the costliness of these random acts hurts us all."

In fact, the latest state parks vandalism tally reads like a crime report from an inner city police precinct: "Broken skylights and handles in restrooms...stolen regulation signs...trees cut and removed...picnic tables burned...ballfield benches cut up...illegal dumping...benches sawed off table...signs shot up...shingles shot off pump house...aluminum swim dock broken...parking barriers chopped...graffiti on handicap railing...bullet holes in toilets...lights shot out...." Repairs and replacement costs may range anywhere from a hundred dollars to replace a stolen sign at Lewis and Clark Caverns to thousands of dollars to construct a new fee booth to replace the one struck by a vehicle at Spring Meadow Lake State Park.

Repairs to historic and cultural sites are particularly costly. When these vulnerable sites are lost forever, so is the opportunity for future generations to view and learn from them. It sometimes takes only one incident to do irreparable harm to sensitive parks. "Pictograph Cave, for example," says Oravsky, "contains 106 pictographs, at least one of which dates back 3,500 years. Visitors travel from all over the world to experience this unique resource. In so doing, they increase local income, learn more about the past, and share their experience with others, instilling a sense of pride in our

American heritage. It is very disheartening to realize that in 10 minutes one vandal with a two-dollar can of spray paint could destroy thousands of years of historical significance. When this happens we hurt ourselves, lose an irreplaceable resource, and a part of our past is gone forever."

What We Need to Do

"A lot of the problem is ignorance," says Claire Dean. "People do not understand how to behave in and care for the outdoors. Many bring their urban habits with them. People even use rock art for landscaping."

Dean and others feel education, particularly with children in the schools, should be the primary focus for eliminating vandalism. "Education needs to take the form of appreciation and respect for the value of our natural resources. People need to realize why our cultural heritage is important to all of us, why it is fragile, and what it means when we speak of irreplaceable resources.

"On-site education is necessary too, but it comes with problems of its own. For one, we need someone to do it and that takes money. At this point, there are few funds available for this. Some

national parks have simply had to shut down because of reduced funding. Then, too, on-site education must be consistent and accurate, and part of the overall spontaneous, outdoor event. People do not want to go out and look for a wilderness experience and be hit with a billboard of do's and don'ts."

> It is very disheartening to realize that in 10 minutes one vandal with a two-dollar can of spray paint could destroy thousands of years of historical significance.

Also, attending to the cleanup and repair of vandalism right away is important. "At archaeological sites especially," says Dean, "if vandalism is already there, it's a green light to go ahead and do more. It's called the 'broken window theory.' Once one window is broken, the rest will be shortly, unless the first is mended." At the same time that vandalism has increased, there has been no equivalent increase in funding or manpower to deal with it. Every year it becomes more difficult for land managers to keep on top of vandalism.

Finally, the conservation community needs to get fully involved. The most likely people to handle these kinds of repairs and cleanup are conservators, but they work in museum settings for the most part and are not always free to travel to sites where vandalism occurs. Until everyone involved in natural resource conservation works to educate people, change mindsets, and eliminate vandalism problems, the escalation will continue.

What Is Being Done

"Most Montana state parks either waive fees altogether or offer reduced fees to educational groups or groups visiting for educational purposes," says Ken Oravsky. "This offers schools of all kinds a great opportunity to come out and learn to appreciate the resource by learning about it." Some parks also have free special programs, such as plays, concerts, games, races, cultural programs, and lectures.

Another event gaining momentum as a way of educating and involving citizens in all 50 states is the National Parks and Conservation Association's (NPCA's) "March for Parks." Every year since 1990, to celebrate Earth Day, NPCA has been inviting people everywhere to participate in this fund-raising activity. Thousands now do so by collecting pledges and donations from supporters and marching to benefit a selected parks program such as trail improvement, recycling, tree planting, land acquisition, or environmental education. March for Parks raises awareness and gets citizens involved in the protection of America's outdoor heritage—its parks, natural spaces, and historical sites. All the proceeds remain in the local community to benefit the projects selected. These events give people a sense of pride in the public facilities around them. Once a feeling of ownership is established and people begin to see parks and recreational areas as belonging to them, they are willing to work harder to take care of them.

Sadly, where education doesn't work, enforcement does. Acts of vandalism at fishing access sites and state parks are misdemeanors punishable by fines, restitution, and possibly jail time. Another unfortunate aspect of vandalism, says Ken Oravsky, is that in order to combat it many public buildings and rest stops are now coarse block structures made with stainless steel hard surface interiors, where everything is nailed down to protect it. Asks Oravsky, "Do we want all of our public facilities to look like the inside of a prison?"

Some of Montana's parks have a relatively low incidence of vandalism. One park manager, Rich Pittsley at Chief Plenty Coups State Park in Pryor, feels this is because local people have a great deal of respect and appreciation for the sacredness of things and for Chief Plenty Coups.

The same low rate of vandalism is seen at Cooney Reservoir State Park, although for different reasons. At this busy fishing, boating, and waterskiing spot, a park host is on-site all summer, and maintenance workers and the park ranger are highly visible. Also, the comfort station is locked at night, and there are plenty of campers to quell problems that could be caused if the place were less crowded and more remote. This is one case where *more* people seems to create immunity to large-scale vandalism since users help police themselves.

The ideal situation would be for everyone to respect the incredible natural resources we have all around us and put such a high value on their preservation that no one would dream of destroying them. If we strive for that ideal, we can keep our public lands alive and unique, and they will be there for us and for all who come after us. ■

Wanderers on the Wind

by Dave Books

OF ALL THE BIRDS that migrate through Montana, only the geese alert us of their passing. We hear the familiar honking of Canadas, or the shrill cries of snow geese, and are reminded of the season's turning. Yet, there are other birds navigating the spring skies; if we listen closely, we might hear the whistles of plovers or curlews on the way to their nesting grounds.

Plovers and curlews belong to a group of long-distance travelers known as shorebirds—a group that includes avocets, stilts, sandpipers, godwits, willets, snipe, phalaropes, and others. As their name implies, they are birds that frequent shallow wetlands, mud flats, and beaches; most are equipped with long legs for wading. But some, like the killdeer and upland sandpiper, spend much of their time away from water.

Of the 49 species of shorebirds that regularly breed in North America, only about a dozen nest in Montana. Another two dozen or so commonly pass through in spring and fall. In all, 40 shorebird species have been documented in the state.

Shorebirds are prodigious fliers, migrating farther than most other bird families. The white-rumped sandpiper, a small shorebird seen rarely in Montana, flies 9,000 miles twice every year between its breeding grounds in the Arctic and its winter home at the tip of South America.

As nature writer Franklin Russell has observed, "There is no such thing as a slow shorebird." With narrow, falcon-like wings and well-developed flight muscles, they are perfectly suited for rapid, sustained flight. Ounce for ounce, the muscle tissue of shorebirds is some of the strongest animal tissue on earth.

During migration, shorebirds travel at heights of 6,000 to 13,000 feet to take advantage of brisk tail winds. While they have been clocked at speeds of more than 100 miles per hour, flight speeds of 40 to 50 mph are more typical. They typically travel in flocks, perhaps to benefit from a collective sense of direction and as a defense against predators.

Shorebirds nest on the ground and typically lay four eggs. The chicks are up and out of the nest in a few hours, and can usually fly after three or four weeks—a necessity for birds that must begin a hemispheric flight by the end of the short northern summer.

While many small shorebirds are similiar in appearance, binoculars and a field guide can help you sort them out. Wildlife management areas (Freezout Lake, Canyon Ferry, Big Lake) and national wildlife refuges (Ninepipe, Benton Lake, Medicine Lake, Lake Mason) are good places to look.

American avocet by D. Robert Franz

BETH DAVIDOW

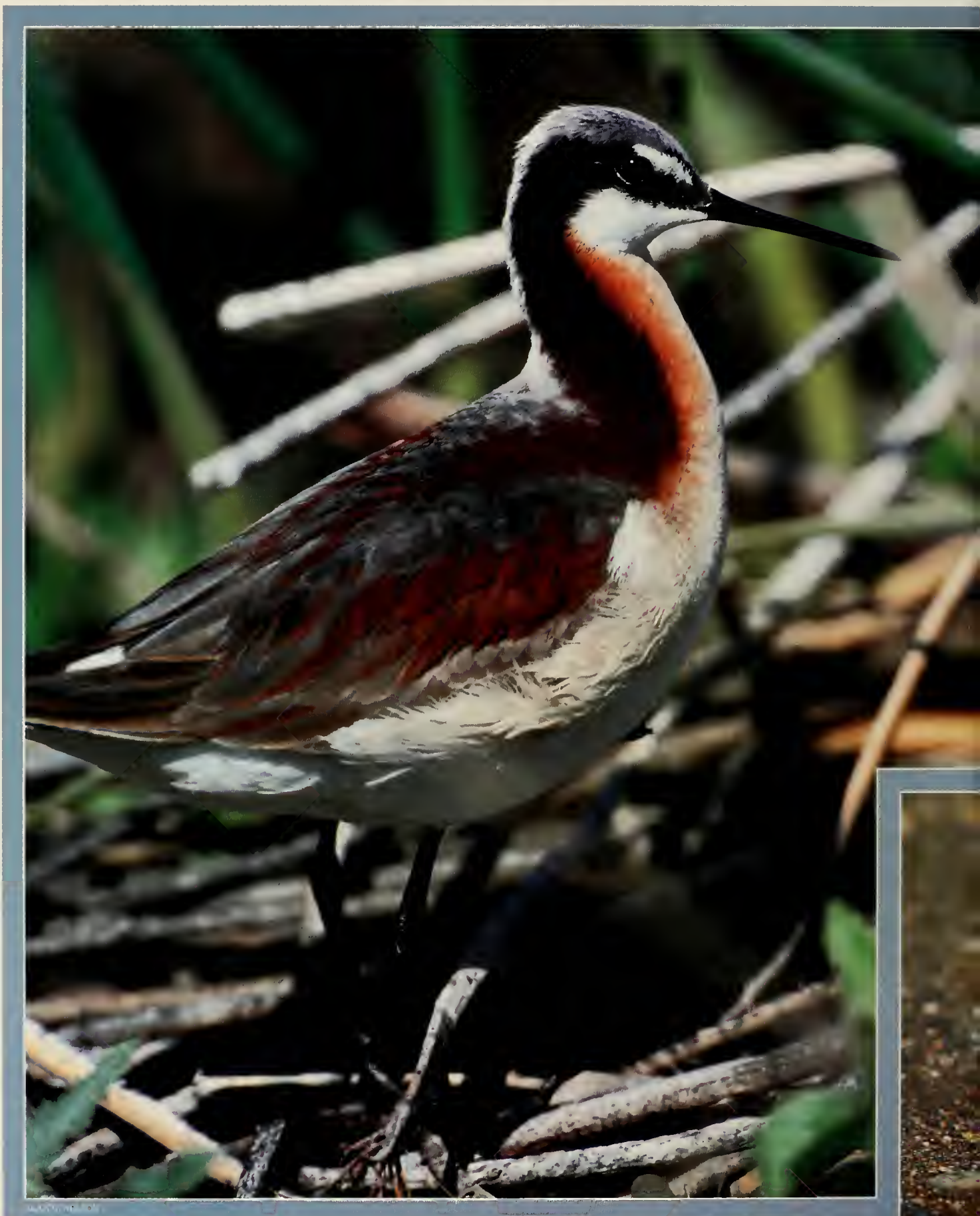
ALAN G. NELSON

LEFT: Tall and elegant, the marbled godwit is among our largest shorebirds. Its long, slightly upturned bill helps it probe water and mud for aquatic insects, snails, worms, and other invertebrates.

BILL MARCHEL

LEFT: The spotted sandpiper is commonly seen along Montana shorelines in summer, teetering nervously up and down as it walks. When flushed, it makes short flights on rapidly fluttering wings.

BELOW: The greater yellowlegs migrates through Montana but doesn't nest here, preferring the muskeg country of Canada and Alaska. Bright yellow legs, a long blackish bill, and a sharp three-note whistle distinguish it from other shorebirds.



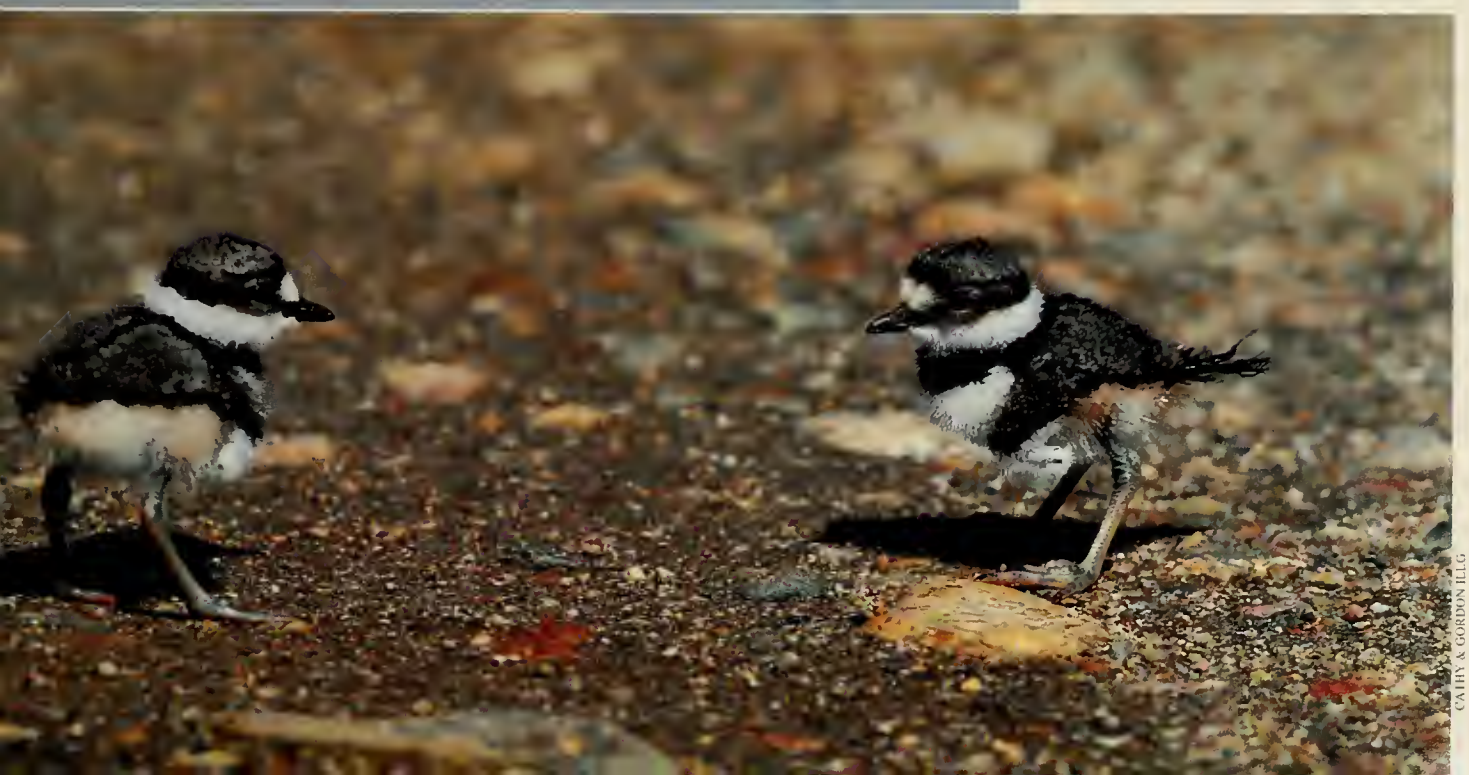
OPPOSITE PAGE: In a reversal of normal roles, the female Wilson's phalarope is more brightly colored than the male. She leaves much of the nest building, incubating, and rearing of the young to her mate.

BELOW: With its long pink legs and striking black and white plumage, the black-necked stilt is perhaps our most flamboyant shorebird.

GARY KRAMER

ABOVE: Giants among shorebirds, long-billed curlews weigh over two pounds and have a wingspread of up to 40 inches.

BELOW: Young killdeers follow adults to feeding areas within a few hours of hatching.



CATHY & GORDON ILLG

FWP WARDEN WINS POGUE-ELMS AWARD

Steve Vinnedge, a Montana game warden stationed in Great Falls, has won a prestigious wildlife law enforcement award for his professional efforts, including promotion of a program to reduce fraudulent purchase of licenses.

Steve Vinnedge (right) receives the Pogue-Elms Award from Ken Ambrock, president of the Northwestern Wildlife Law Enforcement Association.

Vinnedge recently received the Pogue-Elms award from the Northwestern Wildlife Law Enforcement Association, an organization comprising wildlife law enforcement entities throughout the western and northwestern United States as well as Canadian provinces. The award is named for two Idaho game wardens killed in the line of duty. Vinnedge received the award at a law enforcement workshop in Boise in January.

Vinnedge's investigative techniques have led to numerous large-scale license fraud cases involving people throughout the United States who unlawfully purchased Montana resident hunting and fishing licenses.

"Steve is viewed by Montana game wardens as the colleague to contact if they need any assistance with license fraud investigations," says Warden Captain Terry Hill in Great Falls. Vinnedge recently conducted a license fraud training school for his fellow Fish, Wildlife & Parks (FWP) wardens, and has trained many of the wardens hired by FWP over the last two years in the use of computers as wildlife enforcement tools.

Vinnedge, an 11-year veteran with FWP, was stationed in Billings and Colstrip before assuming his duties in Great Falls. Besides his investigative prowess, Vinnedge assists with hunter education programs for adults as well as youths and provides wildlife educational programs in Great Falls schools.

Since 1993, Vinnedge has promoted initiation of a computerized licensing system for FWP that would streamline the licensing process for the agency, for license buyers, and license agents, and facilitate license fraud investigations.

FWP RECEIVES TU AWARD

Montana Fish, Wildlife & Parks has received Trout Unlimited's Conservation Award in the "Professional" category for 1996. FWP Director Patrick Graham accepted the award last fall at an FWP Commission meeting in Helena.

The Montana Chapter of TU nominated FWP for the award based on the agency's timely response to the threats posed by the discovery of whirling disease in Montana and the professional manner in which FWP has undertaken finding a solution. The award was presented to Graham by Frank Cooper, chairman of TU's Montana Chapter.

"It is unusual, yet fitting, that a department rather than an individual receives this award," Graham said in accepting the award. "It was an effort by dozens of people to respond to this, the largest threat to the future of our wild trout fisheries. Trout Unlimited is an important partner in our efforts to contain and combat whirling disease."

For more information on TU in Montana, contact the Trout Unlimited Montana Council, P.O. Box 1638, Polson, MT 59860.

WALLEYES UNLIMITED DONATES $1,000 TO FWP

Walleyes Unlimited of Montana recently presented a $1,000 donation to FWP to benefit the agency's TIP-MONT and Aquatic Education programs.

"We hope the money is used to help prevent illegal introductions of fish into Montana's rivers and lakes," said Roger Larsen of Walleyes Unlimited. "We believe the best way to curb illegal introductions is through education."

Illegal introductions of fish occur when someone moves live fish from one body of water to another, which can cause irreparable damage to a fishery. FWP's TIP-MONT hotline is a toll-free number individuals can call to report violations of fish, wildlife, or parks regulations. It is similar to the well-known Crimestoppers Program and offers rewards for information resulting in apprehension of persons who abuse Montana's natural, historic, or cultural resources. The number is 1-800-TIP-MONT (1-800-847-6668).

FWP's Aquatic Education Program is designed to introduce youngsters to the sport of fishing. For more information on Walleyes Unlimited, write to Walleyes Unlimited, P.O. Box 4427, Helena, MT 59604.

A FOREST RUNS THROUGH IT, TOO

Ten and a half miles of timberland on either side of the Blackfoot River, immortalized in the Norman Maclean tale *A River Runs Through It*, will be protected through public ownership when a three-way purchase-sale-exchange is completed later in the year. The first stage of the project began with

The Nature Conservancy's October 1996 purchase of 11,730 acres from Plum Creek Timber Company, L.P. for $18.1 million. The Bureau of Land Management will receive the acreage from the Conservancy in exchange for scattered parcels of BLM land elsewhere, and the Conservancy will recoup its initial acquisition costs when the exchanged BLM parcels are sold.

"Protecting the natural habitat values of the Blackfoot has been a top priority for The Nature Conservancy of Montana for nearly two decades," claims state director Bill Possiel. "We currently hold conservation easements on 15 tracts totaling nearly 10,000 acres in the Blackfoot Valley." The newly purchased river frontage runs upstream from Johnsrud Park, 15 miles east of Missoula, and lies within a 26-mile stretch known as the Blackfoot River Recreation Management Corridor, jointly managed by Montana Fish, Wildlife & Parks (FWP) and federal, county, and private interests.

Besides the Blackfoot frontage, the new property includes significant portions of the Belmont and Gold Creek drainages. There are nine established recreation sites along the corridor, including popular FWP fishing access sites at Red Rock, Whitaker Bridge, Thibodeau Rapids, and Daigles Eddy. These areas are used by thousands of people each year for floating, swimming, camping, and fishing. The river and its tributaries provide important habitat for cutthroat and bull trout, and the uplands are habitat for elk, white-tailed and mule deer, and moose. Bald eagles raise their young near Goose Rock Flats.—*Linda Coulston (printed with permission of The Nature Conservancy)*

Montana State Parks Calendar

May

1—Lewis and Clark Caverns State Park and Campground Opens
Tours from 9:00 a.m. to 4:30 p.m. every day. Call (406) 287-3541.

"Discovery Days" at Lone Pine State Park
Monthly events as well as outings for seniors and special new programs begin in May. Call (406) 755-2706.

Motorboat Testing at Lake Elmo State Park
Opportunity to test motorboat engines for the upcoming summer. Testing will be the first four weekends in May. Call (406) 247-2940.

Canoe Demo Day at Frenchtown State Park
Held on May 3, 4, 17, 18, 31, and June 1. Demonstrations with new state-of-the-art canoes and kayaks from 10:00 a.m. to 4:00 p.m.

3—Tour de Cure Cycling Adventure at Frenchtown State Park
A trip from the park to Superior and back takes cyclists through some beautiful scenery. Call (800) TOUR-888.

10—Buzzard Day at Makoshika State Park
Fun runs, "turkey shoot," nature walks, and many activities for the whole family. Call (406) 365-6256.

10—Kite Fest at Frenchtown Pond State Park
Festivities begin at 1:00 p.m. Call (406) 542-5531.

15-16—Spring Meadow Lake State Park Field Days
Fifth-grade school classes come to Spring Meadow to learn about natural resources. Call (406) 449-8864, ext. 154.

17—Paddlefest at Wayfarers State Park
Come and try different types of kayaks. Call (406) 758-6260.

26—Bannack Guided Tours
Call ahead for tour schedule (406) 834-3413. The visitor center will be open the weekend of May 10 and then open daily beginning May 24 from 10:00 a.m. to 6:00 p.m.

30—Evening Campfire Talks Begin at Lewis and Clark Caverns
Campfire talks feature historical, recreational, and natural resource topics. Talks begin at dusk on selected days of the week. Call (406) 287-3541.

Memorial Day Weekend "Loon and Fish Festival" in Seeley Lake
Art show, craft sale, guided bird walks, loon talks, and calling contest. Call (406) 444-1276.

June

5—Evening Campfire Programs Begin at Makoshika State Park
Thursday night talks include paleontology, geology, and history. Call (406) 365-6256.

7—Nature Movies at Lone Pine State Park Visitor Center
Movies shown at the visitor center from 10:00 a.m. to 2:30 p.m.

7—Saturday Night Campfire Interpretive Talks at Missouri Headwaters State Park
Programs will be presented at the Headwaters Campground beginning at 7:00 p.m. each Saturday. Call (406) 994-6934.

12—Makoshika Youth Program for Ages 7-13
Scheduled each Thursday from June 12 through August 7 from 9:30 a.m. to 1:30 a.m. Call (406) 365-6256.

14—Cowboy Poetry Workshop at Bannack State Park
Workshop held from 10:00 a.m. to 4:00 p.m. Call (406) 834-3413.

15—Lewis and Clark Caverns State Park
Tour hours expanded from 9:00 a.m. to 6:30 p.m.

17—Discovery Days at Spring Meadow Lake State Park
Scheduled every Tuesday for eight weeks. Educational programs are for 8 to 12 year olds. Call (406) 449-8864, ext. 154.

21—Kids' Theater and Ghost Walk at Bannack State Park
Sessions from 2:00 p.m. to 6:00 p.m. and again from 7:00 p.m. to 9:00 p.m. Call (406) 834-3414.

21—"Shoot or Don't Shoot" at Council Grove State Park
Bring your camera and learn the techniques of taking good outdoor photographs. Call (406) 542-5533.

28-29—Lewis and Clark Encampment at Giant Springs State Park
Living interpretation of the portage around Great Falls with a variety of historical activities for all ages, including plays, buffalo barbecue, lectures, guided tours, and float trips. Call (406) 454-5840.

28—Buckskinners' Rendezvous at Council Grove State Park
A chance for enthusiasts and their families to see unique weapons and attire without a trip to a museum.

28—Artists' Workshop at Bannack State Park
An all-day workshop with artist Vern Russell. Call (406) 834-3414.

The Year of the Worm

by Dave Books

Eat your hearts out, high-tech anglers. Most of Montana's fish records for 1996 were set using that time-tested, reliable, inexpensive, user-friendly bait favored by folks all over America, the earthworm.

This isn't to say that the latest supersonic crankbuzz from Cabela's won't nail a monster bass or that a delicate feathered creation from Orvis won't catch a record rainbow in 1997—only that garden hackle did pretty well in 1996.

Of nine record fish netted last year, seven were taken on worms or nightcrawlers. **Gene Bassett** of Miles City shattered last year's white crappie record (2.44 pounds) with a 3.68-pound bruiser. Bassett's fish, caught on a worm in the Tongue River near Miles City, measured 18.5 inches.

The yellow bullhead record was broken twice in 1996, the first time on May 19th by Jay Watson of Worden and the second time a few weeks later by **Mike Vaughn** of Billings. Both fish were caught on worms at Conter's Bass Pond.

We added one new fish to the records list in 1996: the largescale sucker. Libby resident **Loren Kujawa's** 5.06-pound specimen, taken on a nightcrawler in the Kootenai River, sets the opening mark for this species. The largescale sucker, according to George Holton's *A Field Guide to Montana Fishes*, is a Montana native found in lakes and streams west of the Continental Divide.

Loren Kujawa displays his largescale sucker.

Theo Hamby of Browning edged the old lake whitefish record of 10.00 pounds with a 10.08-pounder from Lower St. Mary Lake. Hamby's 26-inch whitefish fell for a worm on a No. 6 Lasersharp hook.

The long-standing stonecat record fell when **Dale Bjerga** of Havre hoisted a 0.54-pound battler from the Milk River. And the 1995 Flathead chub record of 0.30 pounds from the Missouri River near Fred Robinson Bridge was bested by Bozeman angler **Matt Sloat's** 0.31-pound fish from the same locale. You guessed it—both anglers were using worms.

Fishing lure manufacturers will be relieved to learn that two record fish were taken from Montana waters on hardware last year, and they were beauties: a 16.38-pound walleye and a 6.10-pound smallmouth bass.

Steven McMorris of Billings set the new walleye record with a 31.5-inch fish from Cooney Reservoir. McMorris caught his fish on a Rapala.

And Lewistown angler **Mike Otten** edged the existing smallmouth bass record of 6.09 pounds, set in 1990 by Terry Druyvestein, with a 6.10-pound, 20.3-inch fish. Both bass were taken at Fort Peck Reservoir. Otten caught his big smallmouth last spring on a crankbait in Fourchette Bay.

Mike Otten with his record smallmouth bass.

While we all enjoy scanning the catalogs and tackle store shelves each spring for the newest and deadliest in fishing lures, it's comforting to know that even in this age of bass boats, graphite rods, fish-finders, and polarized sunglasses, one thing hasn't changed. Whether we're talking trout, walleye, bass, or bullheads, fish still like worms. ■

Montana's Record-Setting Fish (1996)

Species	Weight	Angler	Year	Location
Arctic grayling	3.21 lbs.	Frederick C. Dahl	1994	Handkerchief Lake
Bigmouth buffalo	57.75 lbs.	Craig D. Grassel	1994	Nelson Reservoir
Black bullhead	2.33 lbs.	Darwin Zempel, Jr.	1994	Lower Flathead River
Black crappie	3.13 lbs.	Al Elser	1973	Tongue River Reservoir
Blue sucker	11.46 lbs.	Doug Askin	1989	Yellowstone River (near Miles City)
Bluegill	2.64 lbs.	Brent Fladmo	1983	Peterson s Stock Dam
Brook trout	9.06 lbs.	John R. Cook	1940	Lower Two Medicine Lake
Brown trout	29.00 lbs.	E.H. Peck Bacon	1966	Wade Lake
Bull trout	25.63 lbs.	James Hyer	1916	unknown
Burbot (ling)	17.08 lbs.	Jeff E. Iwen	1989	Missouri River (near Wolf Point)
Carp	38.50 lbs.	Don Bagley	1986	Eyraud Lakes
Channel catfish	25.89 lbs.	Gordon Wentworth	1984	Fort Peck Reservoir
		Tom Hilderman (tie)	1988	Fort Peck Reservoir
Chinook (king salmon)	31.13 lbs.	Carl L. Niles	1991	Fort Peck Reservoir
Cisco	1.46 lbs.	Jim Liebelt	1990	Dredge Cut Trout Pond
Coho salmon	4.88 lbs.	Irven Stohl	1973	Fort Peck Reservoir
Cutthroat trout	16.00 lbs.	William D. Sands	1955	Red Eagle Lake
Flathead chub*	**.31 lbs.**	**Matt Sloat**	**1996**	**Missouri River (Fred Robinson Bridge)**
Freshwater drum	20.44 lbs.	Richard C. Lee	1987	Fort Peck Reservoir
Golden trout	4.90 lbs.	Carl Radonski	1993	Lightning Lake
Goldeye	2.91 lbs.	Vance Bubba Kielb	1989	Irrigation canal (west of Malta)
Green sunfish	0.56 lbs.	Roger Fliger	1991	Castle Rock Reservoir
Kokanee (salmon)	5.94 lbs.	Forrest Johnson	1976	Pishkun Reservoir
Lake trout	42.00 lbs.	Dave Larson	1979	Flathead Lake (east shore)
Lake whitefish*	**10.08 lbs.**	**Theo Hamby**	**1995**	**Lower St. Mary Lake**
Largemouth bass	8.16 lbs.	Juanita A. Fanning	1984	Milnor Lake
Largescale Sucker**	**5.06 lbs.**	**Loren Kujawa**	**1996**	**Kootenai River**
Longnose sucker	3.27 lbs.	Ray Quigley	1988	Marias River
Mountain whitefish	5.09 lbs.	Mervin Frog Fenimore	1987	Kootenai River
Northern pike	37.50 lbs.	Lance Moyler	1972	Tongue River Reservoir
Northern squawfish	7.88 lbs.	Darrel Torgrimson	1991	Noxon Rapids Reservoir
Paddlefish	142.50 lbs.	Larry Branstetter	1973	Missouri River
Peamouth	0.64 lbs.	Gordon Stewart	1991	Ashley Creek
Pumpkinseed	0.95 lbs.	Tim Colver	1985	Milnor Lake
Pygmy whitefish	0.16 lbs.	Orlin Iverson	1982	Ashley Lake
Rainbow trout	29.02 lbs.	Stanley Ross	1991	Kootenai River (David Thompson Bridge)
Rainbow-cutthroat hybrid	30.25 lbs.	Pat Kelly	1982	Ashley Lake
River carpsucker	3.50 lbs.	James Jessen	1991	Yellowstone River near Terry
Rock bass	0.57 lbs.	Don Holzheimer	1989	Tongue River Reservoir
Sauger	8.81 lbs.	Gene Moore	1994	Fort Peck Reservoir
Shorthead redhorse sucker	4.68 lbs.	Ray Quigley	1985	Marias River near Loma
Shortnose gar	3.06 lbs.	John Johnson	1977	Fort Peck dredge cuts
Shovelnose sturgeon	13.72 lbs.	Sidney L. Storm	1986	Missouri River
Smallmouth bass*	**6.10 lbs.**	**Mike Otten**	**1996**	**Fort Peck Reservoir**
Smallmouth buffalo	32.63 lbs.	Richard Liesener	1994	Nelson Reservoir
Stonecat*	**0.54 lbs.**	**Dale Bjerga**	**1996**	**Milk River**
Tiger muskellunge	27.00 lbs.	Dan Dupea	1994	Lebo Lake
Utah chub	1.81 lbs.	Eugene Bastian	1992	Canyon Ferry Reservoir
Walleye*	**16.38 lbs.**	**Steven McMorris**	**1996**	**Cooney Reservoir**
White bass	1.13 lbs.	Ludwig Dubbe	1986	Fort Peck dredge cuts
White crappie*	**3.68 lbs.**	**Gene Bassett**	**1996**	**Tongue River Reservoir**
White sturgeon	96.00 lbs.	Herb Stout	1968	Kootenai River
White sucker	5.33 lbs.	Fred Perry	1983	Nelson Reservoir
Yellow bullhead*	**0.84 lbs.**	**Mike Vaughn**	**1996**	**Conter's Bass Pond**
Yellow perch	2.37 lbs.	Vernon Schmid	1988	Ashley Lake

***New Montana record for 1996** ****New to Montana's record list**

Readers Respond

Custer Forest Badlands Are Spectacular

I began receiving *Montana Outdoors* a couple of months ago and I am thrilled with the photography!

Having grown up in Montana, I have developed that peculiar innate desire to spend the rest of my life here. My son and I attempted to live out-of-state last year, but ached to move back, so we did!

Western Montana is magnificent, and traveling west several times each year is a feast to my soul, but I grew up in the southeast corner of Montana, near Ekalaka. Three years ago I spent some time working there as a nurse in their beloved hospital/nursing home. At the end of my shift I would drive south on the "oil" until I reached the entrance to the Custer National Forest, about seven miles from town. A marginally kept road leads through forested hills to a rimrock area which at times offers a view of Devils Tower, perhaps 80 to 90 miles south. This rimmed area extends west for about 10-15 miles with views that stun my eyes and at times, bathe my soul in bliss.

There are rugged ravine-riddled badlands providing safe habitat for various animals such as coyotes, jackrabbits, rattlesnakes, and mule deer. In a recent issue there is a photo that reminded me of a poem that I had written. I realize that you do not publish poetry, I thought you might enjoy it. Thank you for a lovely magazine.

Eastern Montana
where the wind buffets the clouds
and the cows,
but not the sagebrush
and the deer hunker.
where the jets permeate the serenity
reminding us that we are not as remote as we might like to think.

—*Suzy Musser, Miles City*

Justin Hoadley's attitude adjustment.

What Montana Is All About

We so thoroughly enjoy your publication that we give subscriptions to our grandsons. One grandson, 9-year-old Justin Hoadley, who lives in Idaho, was full of woe when he came to spend vacation with us in Lima. He was sure there was nothing to do. His attitude changed immensely when he caught a four-pounder on his first day of fishing on the Red Rock River just east of Lima. He came up the riverbank with his arms high in the air saying, "THIS is what Montana is all about!" What a delightful experience for this young man.—*Mrs. Lewis Hoadley, Lima*

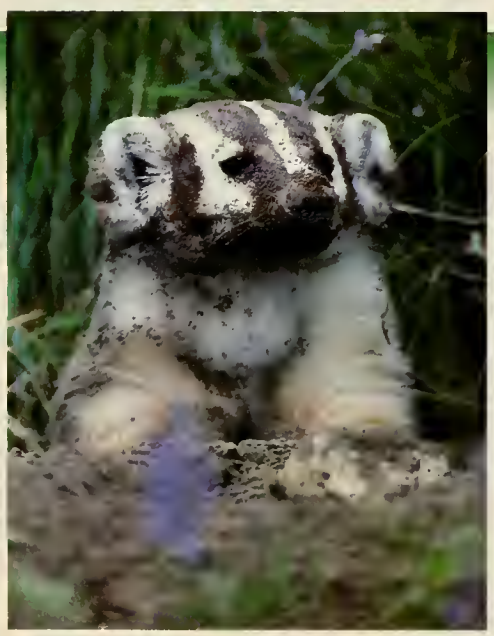
Cowbird Solution?

It's good to know that graduate students at the University of Montana are concerned about the cowbird. They will prolong grant funding if they continue to think and question and run field studies.

But anyone familiar with the cowbird problem in Michigan and Illinois understands that the only intelligent response to cowbirds is not another study but killing them wherever and whenever possible.

Just take care that you don't mistake a female redwing for a pestiferous cowbird.—*D.H. Stewart, Bozeman*

Cowbirds, like all songbirds, are protected by the Migratory Bird Treaty Act of 1918 and by state law. They may only be killed under permit.—Editor



Window on the Wild

Montana Outdoors Video highlights the diversity of outdoor opportunities unique to Montana. If you enjoy the outdoors, then Montana Outdoors Video is for you. Subscribe now and you'll receive three videos a year for an annual fee of $25.

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Send subscriptions and payment to: **Montana Fish, Wildlife & Parks**; 930 Custer Avenue West; Helena, MT 59620; (406) 444-2733.

CONTRIBUTORS

Auchly

BRUCE AUCHLY warns that because cottonwoods along some of Montana's rivers are slowly disappearing, hunters, floaters, ranchers, and birdwatchers are all facing a period when there will be virtually no mature trees. That could have devastating effects on white-tailed deer, songbirds, bald eagles, ospreys, herons, and other wildlife. According to researchers, ice, drought, dams, and summer grazing are all taking a toll on cottonwood growth and survival. Dams are the major culprits because they curtail the spring floods that historically have scoured river channels and created the proper conditions for cottonwood regeneration. His article, "Taking a Cotton To Cottonwoods" (p. 2), provides a historical perspective on these important trees and describes the threats to their future abundance. Auchly is FWP's information officer for Region 4 in Great Falls.

Flath

Relatively little is known about grebes, says DENNIS FLATH, perhaps because they are so secretive and difficult to study. Some species gather in large numbers for a time during fall migration, then disappear overnight to points south. In this issue's "Watchable Wildlife" segment, Flath pulls together interesting facts on anatomy, range, behavior, and nesting habits of Montana's six grebe species. To find out where these water birds congregate in Montana and other western states, turn to "A Gathering of Grebes" beginning on page 8. Flath, who works out of the Region 3 (Bozeman) headquarters, is FWP's nongame coordinator.

Although mayflies are present in nymphal stages in lakes and streams throughout the year, it is their brief emergence as winged adults that gets the undivided attention of trout—and trout anglers. So says E. NEALE STREEKS in "Mayfly Magic" (p. 14), an in-depth look at the life cycle and allure of this beautiful order of aquatic insects. "The dry fly picture is never more focused than when a good mayfly hatch is on. The trout know that dinner is served and rise repeatedly, rhythmically." Streeks is a fishing guide and author who lives in Great Falls.

Ulm Pishkun State Park near Great Falls was established in 1972 to preserve one of the West's most spectacular buffalo jumps, or pishkuns. In this issue's "Lands Legacy" installment (p. 19), DEBRA JO WILLIAMS describes how a recent land exchange has made possible construction of an on-site interpretive center. Scheduled for completion in 1999, the center will showcase the culture and traditions of the prehistoric people who used the site between 500 and 1500 A.D. and explain the spiritual importance of the buffalo to Native American tribes. Williams, who lives in Helena, is a Carroll College student majoring in writing.

Williams

As more and more people visit our state parks, says CARILLON STEORTS, the risk of destruction and defacement of these areas increases. Sadly, parks vandalism is escalating all across the country, and Montana is no exception. For a look at vandalism, what it costs us, and what we can do about it, turn to "Protecting Our Heritage" on page 23. Steorts is a word processing technician at FWP's Region 5 headquarters in Billings. Her article is illustrated with the creative cartoons of JOHN POTTER, editorial artist at the *Billings Gazette*.

Steorts

MO thanks the following artists and photographers for their contributions to this issue: STEVEN AKRE, Ulm; LYNN BACON, BETH DAVIDOW, and DUSAN SMETANA, Bozeman; D. ROBERT FRANZ, Morrison, CO; CHUCK HANEY, Whitefish; CATHY & GORDON ILLG, Lakewood, CO; DONALD M. JONES, Troy; GARY KRAMER, Willows, CA; JOHN LAMBING, Helena; GARY LEPPART and JOHN POTTER, Billings; BILL MARCHEL, Fort Ripley, MN; NEAL & MARY JANE MISHLER, ALAN G. NELSON, and E. NEALE STREEKS, Great Falls; JOHN G. OBREY, JR., Salt Lake City, UT; LANCE R. PECK, Cody, WY; W. STEVE SHERMAN and AL TROTH, Dillon; KEITH A. SZAFRANSKI, Livingston; and JAN L. WASSINK, Kalispell. Thanks also to LUCILLE LUNDIN who works for the department in Great Falls, and the Montana Historical Society.

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